

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Nov. 10 - Nov. 17, 2008.

Gov. Arnold Schwarzenegger gleams after NIF tour



Schwarzenegger addressed the media after his tour of NIF.

Gov. Arnold Schwarzenegger toured the National Ignition Facility last week and held a press conference to discuss the nearly completed laser and applications, particularly the Laser Inertial Confinement Fusion-Fission Energy project, or LIFE.

The governor said LIFE could help the state's future energy needs while simultaneously decreasing dependence on fossil fuels. Schwarzenegger said fusion energy would not only assist the state in meeting future energy demands, but also would help reduce greenhouse gas emissions that negatively impact climate.

"This fusion energy, which creates no greenhouse gases, is really gigantic," he said. "I can't wait for this to become a reality here. It would provide so much

energy. We're talking here about power thousands more watts than lighting up the whole United States. For us to be at the forefront of this in California is really terrific."

Former U.S. Secretary of State George Shultz toured the NIF with the governor and also has been consulting him on energy issues during his administration

"This is a place where really first class science is taking place all the time," Shultz said. "When you look at the results, you see that science is, in many respects, the key to our future. Science is something that deserves support because in the end science will support us and our future."

To read more about the visit, go to <http://gov.ca.gov/press-release/10984>
For coverage of the visit, see
https://newsline.llnl.gov/_rev02/articles/2008/nov/images/KGOTV_Schwarzenegger_1108.mov and
https://newsline.llnl.gov/_rev02/articles/2008/nov/images/KGOAM_Schwarzenegger_1108.mov

Astronomers capture first images of newly-discovered solar system



Artist's conception of the multiple planet system HR 8799, imaged by Gemini North adaptive optics and confirmed with W.M. Keck Observatory imaging.

Astronomers for the first time have taken snapshots of a multi-planet solar system, much like ours, orbiting another star.

The new solar system orbits a dusty young star named HR8799, which is 140 light years away and about 1.5 times the size of our sun. Three planets, roughly 10, 10 and 7 times the mass of Jupiter, orbit the star. The size of the planets decreases with distance from the parent star, much like the giant planets do in our system.

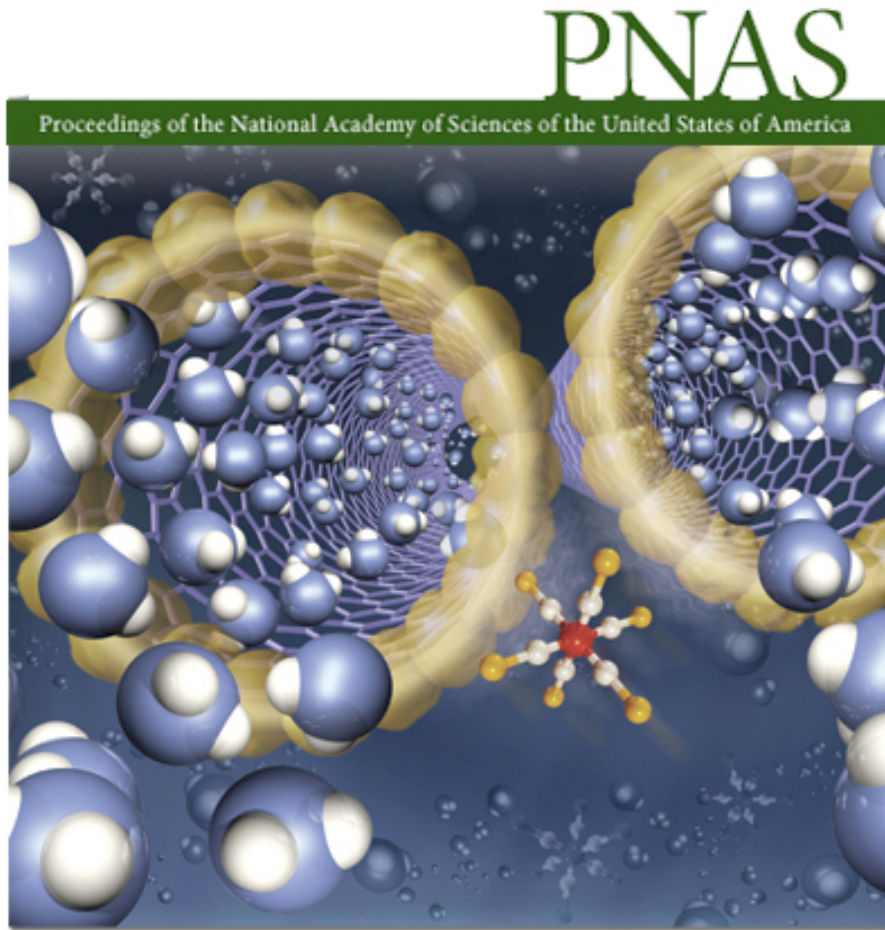
And there may be more planets out there, but scientists say they just haven't seen them yet.

These are the first pictures of an entire system," said Bruce Macintosh, an astrophysicist from the Laboratory and one of the key authors of a paper appearing in the Nov. 13 issue of *Science Express*. "We've been trying to image planets for eight years with no luck and now we have pictures of three planets at once."

Using high-contrast, near-infrared adaptive optics observations with the Keck and Gemini telescopes, the team of researchers from Livermore, the NRC Herzberg Institute of Astrophysics in Canada, Lowell Observatory, University of California Los Angeles, and several other institutions were able to see three orbiting planetary companions to HR8799.

The research was featured in the *New York Times*, *Los Angeles Times*, *Newsweek*, *Washington Post*, *New Scientist*, *Reuters*, *Associated Press*, *Sky and Telescope* and among others. See coverage in the *New York Times* at http://www.nytimes.com/2008/11/14/science/space/14planet.html?_r=2&scp=1&q=new%20planets&st=cse&oref=slogin&oref=slogin

Carbon nanotube research tops *PNAS* cover



Negative charges on the rims of carbon nanotubes exclude ions.

Research conducted by Livermore researchers in the use of carbon nanotubes for molecular transport is the cover story in the Nov. 11 issue of the *Proceedings of the National Academy of Sciences*.

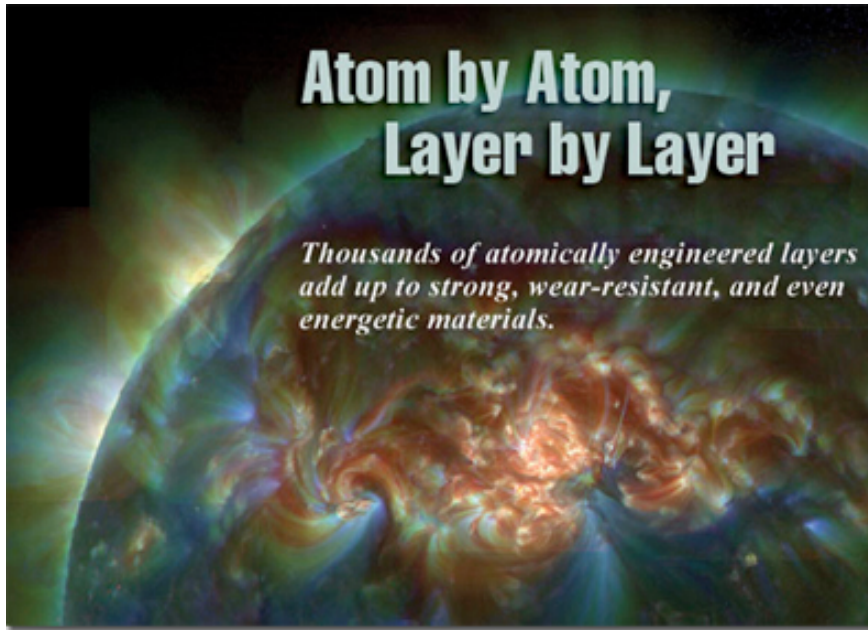
Molecular transport across cellular membranes is essential to many of life's processes, for example electrical signaling in nerves, muscles and synapses.

In biological systems, the membranes often contain a slippery inner surface with selective filter regions made up of specialized protein channels of sub-nanometer size. These pores regulate cellular traffic, allowing some of the smallest molecules in the world to traverse the membrane extremely quickly, while at the same time rejecting other small molecules and ions.

Researchers the Laboratory are mimicking that process with manmade carbon nanotube membranes, which have pores that are 100,000 times smaller than a human hair, and were able to determine the rejection mechanism within the pores.

To read more, go to https://publicaffairs.llnl.gov/news/news_releases/2008/NR-08-06-03.html or <http://www.pnas.org/content/105/45/17250>

Strong, wear-resistant, energetic materials featured in *S&TR*



Like an atomic-scale submarine sandwich, nanolaminates -- irregular layers of materials -- are making great strides in the science fields

Nanolaminates are composites made from dozens of alternating layers of materials, with each layer just 0.2 to 200 nanometers thick. The thickest layer may be only a few thousand atoms across, 1 one-hundredth the width of a human hair.

The technology has applications in astrophysics in which mirrors incorporate highly reflective multilayer coatings as well as in computer systems in which multilayer synthesis is used to manufacture magnetic hard-disk drives.

Livermore's Troy Barbee is a pioneer in the field and his research is featured in the latest issue of LLNL's *Science and Technology Review*.

To read more, go to <https://www.llnl.gov/str/NovDec08/barbee.html>.

Latest edition of weekly *Newsline* available



Newsline provides the latest Lab research and operations news. See the latest issue at <https://newsline.llnl.gov/rev02/index.php>

Photo of the week



Ride on: More than 100 motorcyclists from the Lab, Sandia and outside rode from the main site to the Lab's Site 300 last week for Lab Ride V, an annual fundraiser sponsored by the Livermore Laboratory Armed Forces Veterans Association (LLAFVA). This year, donations, in the amount of \$1,847, supported the LLAFVA scholarship fund for veterans and "Hope for the Heart," an agency partner with the Alameda County Community Food Bank. Riders were treated to a barbecue put on by the Alameda County Fire Department at Site 300.

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